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CHEMICAL & ENGINEERING NEWS

C&EN

MARCH 21, 1994

EUROPEAN FIBER MAKERS MUST REFOCUS TO MEET FAR EAST CHALLENGE PAGE 11

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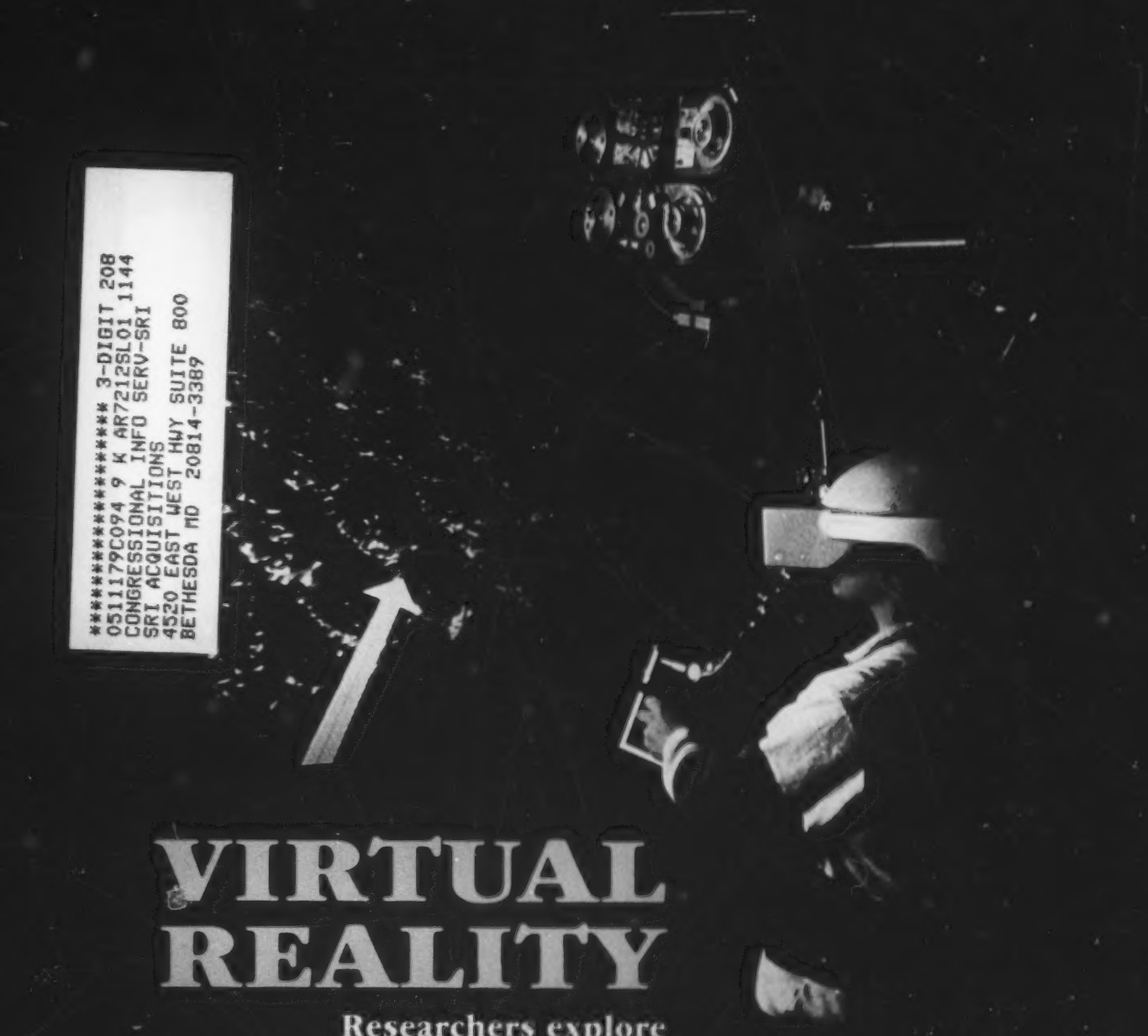

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Researchers explore applications to chemistry
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CHEMICAL & ENGINEERING NEWS

C&EN

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■ New treatment for diabetes, involving implantation of encapsulated insulin-secreting cells in a patient, passes first clinical test. **Page 4**

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COVER: Operator uses head-mounted display and force-feedback handgrip to explore a graphite surface at atomic resolution with a scanning tunneling microscope. Photo by Alex Treml Photography, courtesy of the University of North Carolina, Chapel Hill, department of computer science

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BUSINESS

European fiber makers face increasing competition from the Far East as a result of many textile manufacturers moving there; the solution, industry group says, is slimmed down operations with focus on higher value added and specialty fibers. **Page 11**

French chemical industry will regain some momentum this year, with production increasing about 2% over last year's 1.3%, largely on the strength of the pharmaceuticals sector. **Page 14**

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LETTERS

Benefits of eye protection

Letters to the editor by Jay A. Young and John M. Hoffman (C&EN, Feb. 7, page 3), deal with legalities that do not require the wearing of eye protection "when nothing dangerous in going on." Somehow this seems to put down the proven benefit of wearing eye protection in all situations where there is any potential for eye injury.

DuPont and other leading industrial firms half a century ago began requiring eye protection at all times in factories and laboratories. Academics were slow in adopting this practice, but it now is universally accepted—at least in chemistry laboratories. Surely any eye injuries in academic or industrial laboratories, no matter how unexpected the accident, will result in penalties for management if the routine wearing of eye protection has not been enforced.

Malcolm M. Renfrew
Emeritus Professor
University of Idaho,
Moscow

Sperm count speculation

Bette Hileman's article "Environmental Estrogens Linked to Reproductive Abnormalities, Cancer" (C&EN, Jan. 31, page 19) claims "sperm counts in men worldwide have fallen about 50% since 1940."

This is the kind of scare tactic that helps to get funds for governmental and environmental agencies. While the chemical structure of the active ingredient of marijuana is noted, the article does not report on the effects it has on the male.

The exposure to marijuana has increased since 1940. By 1988, the National Institute of Drug Abuse reported that there were 11,616,000 users of marijuana. These individuals were repeatedly exposed to extremely high dose levels of this natural estrogen. This compares with the parts per million or parts per trillion or less exposure to compounds such as DDT, DDE, and Kepone, which the article suggests cause abnormalities and cancer.

J. B. Webber of North Carolina State University reported in *Weeds Today* (Spring 1979, page 22) that the active ingredient in marijuana accumulates in body tissues and fluids. This is similar to many of the compounds that caused the concern by the scientists in Hileman's article.

Alcohol, which is usually consumed along with marijuana, is also known to have a similar effect on males. Therefore, you have a combination of exposures affecting male virility.

Why must environmentalists constantly bash decades-old pesticides and related compounds to support the hypothesis that the chemical industry has polluted the world?

Let's study and report on the real cause of lower male sperm counts—marijuana.

Raymond W. Luckenbaugh
Gettysburg, Pa.

No environmental conspiracy

As a professional chemist for almost 15 years, and an active participant in the "environmental movement" for over 20, I feel compelled to respond to Fred Tausch Jr.'s letter (C&EN, Jan. 31, page 5) and to some of the responses to it.

Tausch makes it sound as if the environmental movement is some organized conspiracy aimed at the destruction of the chemical industry and the American way of life. I know of no such conspiracy, even though I was the vice-chairman and then chairman of the local Sierra Club. In fact, the term "environmental movement" is somewhat false, as if Nature Conservancy, Sierra Club, Greenpeace, and Earth First! are all perfectly united with the same political agenda. They are, as Carlyle Herrick (C&EN, Feb. 21, page 2) discussed, united in the idea that a clean environment is the obligation of the human race as residents of this planet. But, as with the rest of the political spectrum, there is great disagreement as to the best means to achieve this goal.

I do find one similarity between many people in these environmental groups and many people in the chemical industry: a great distrust of the people on the other side. That is the fundamental problem. We do not need ACS to take on an adversarial position. Only by having environmentalists and chemists work together will we begin to solve these complex and important problems.

Jonathan W. Foise
Mentor, Ohio

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Growing Competition from Far East Troubles European Fiber Makers

■ ***Industry group sees solution as trimmer producers focusing on higher value added and specialty fibers***

Patricia L. Layman, C&EN London

Given the inexorable move of textile makers to the Far East and other developing economic areas, is there a future for the fiber manufacturing industry in Western Europe? Yes—but in a slimmed down version that concentrates on higher value added and specialty fibers. That's the message from CIRFS, the International Rayon & Synthetic Fibers Committee, in a C&EN interview with its new director general and in a report the organization is publishing this spring via the U.K. publisher, Economist Intelligence Unit.

And it means that, for chemical suppliers to the fiber industry, the task will be to keep an eye on quality and specialty demands by their customers—and to prepare to hedge their bets with investments in the Far East, as well as in their traditional areas.

Key to the problem facing the Western European fibers industry is the move of many of its customers—textile makers—to the Far East. Not only are labor costs low there, which is important for labor-intensive textile and apparel manufacturing, but also national governments regard these industries as strategically important, capable of employing large numbers of the population and generating hard currency from exports.

This is not a newly emergent problem, of course. In May 1988, officials at DSM Chemicals in the Netherlands were already noting the shift of synthetic fiber production to newly industrialized countries and its consequences for European producers of fibers and fiber raw materials.

Charles Gupton/Uniphoto

Cloth dealer in a market in China, which is becoming a major supplier to world markets.

But the problem has intensified since then. In just one end-use sector—spun yarns, which make up more than half of the Western European fibers market—fiber consumption has been falling since 1987, from some 3.3 million metric tons in that year to just below 2.9 million metric tons in 1991.

Further declines are expected in Western Europe during the 1990s, the result of increasing access of apparel products made in developing countries reducing the demand for domestically produced textiles, and the lack of export opportunities for textiles made in Western Europe. The outlook is for a 10 to 20% fall in fiber consumption for the manufacture of spun yarns during this decade.

In contrast, production and consumption of spun yarns, particularly for cotton and cottonlike textiles, are expected to increase significantly in Asia in the 1990s. In China, for example, a 35% growth in production is forecast during this decade, and in the Indian subcontinent, increases in India and Pakistan of 25% and 22%, respectively, are expected. Production gains are also likely in Indonesia, the Philippines, and Thailand during the first half of the decade, and in Malaysia, Bangladesh, and Vietnam in the latter half of the 1990s.

Despite those basic trends, however, there is still a significant role for producers of both fibers and textiles in Western Europe, contends Colin Purvis, who was appointed director general of CIRFS in January. He succeeds Jean-Louis Juvet, who had headed the organization for 27 years, including its recent move from Paris to new headquarters in Brussels.

Purvis, formerly secretary general of the British Apparel & Textile Confederation, has taken over a small but impressively effective organization that represents an industry that experienced radical restructuring in the 1980s and is still troubled by overcapacity. It is, as the representative of one member company says, "run [by] a tiny handful of professionals, all of whom have to be very good at what they do. CIRFS is the best organization we belong to."

CIRFS members include nearly two

dozen companies producing synthetic and cellulosic fibers in Western Europe—essentially those countries in the European Union, the Nordic countries, and Austria and Switzerland. The members account for about 90% of manmade fiber production (excluding polypropylene fibers, production of which is structured differently than that of other synthetics) in Europe. Membership ranges from relatively small fiber-producing specialists to the fibers divisions of major chemical companies.

CIRFS' staff of 10 covers three main areas: statistics, technical and environmental affairs, and economics and lobbying. Technical and environmental affairs are becoming increasingly important. For example, CIRFS is contributing industry input into a debate on whether or not there will be a European Union-sanctioned Eco-label (environmentally friendly approval label) for textiles, and if so, what criteria should be used.

Probably the organization's most visible role, however, is analysis of economic issues. This activity enables CIRFS to back up its presentations to various governmental and trade bodies, on both a national and multinational basis, and to keep members up to date on what's going to affect them.

CIRFS took a fairly active role, for example, in the Geneva negotiations on the General Agreement on Tariffs & Trade (GATT), working with its textile manufacturers counterpart associations. High on the agenda: dumping actions and unfair barriers to trade.

Trade issues within Europe are also one of the major concerns of CIRFS, particularly the need for a level playing field regarding national government subsidies. Currently, a framework agreement with the European Commission covers national subsidies or investments in the manmade fibers industry. And this, says Purvis, "we feel needs to be maintained." According to the framework, the commission must be notified in advance of all government subsidies to the synthetic fibers sector, and any subsidy assistance for increasing capacity is forbidden. Where subsidies are granted for modernization, the funds should be linked with restructuring and reducing capacity, Purvis explains. In that way, he argues, "market forces will direct the industry structure, rather than government intervention.

"Our industry is 'chemical' in its capital intensity—the economics favor running at full blast whenever you can. But we are serving textile markets, which are highly cyclical. It is difficult to run during downswings on the textile side. Therefore, an artificial creation of capacity [from government subsidies] would be extremely damaging to the health of the sector."

The fibers industry is currently in the downswing of the business cycle, he says, and has been since 1991. However, "There are some signs that the situation is not as bad as it was, although recovery is not quite here. But recovery there will be," he emphasizes.

That's the short-term situation. "Long term, you have to look at more structural factors about our industry and our customers' industries. One factor affecting our industry is that certain types of textile production are migrating to other parts of the world, particularly with low labor costs," he concedes. "Some 40% of manmade fibers go into clothing. Therefore that has important implications for us."

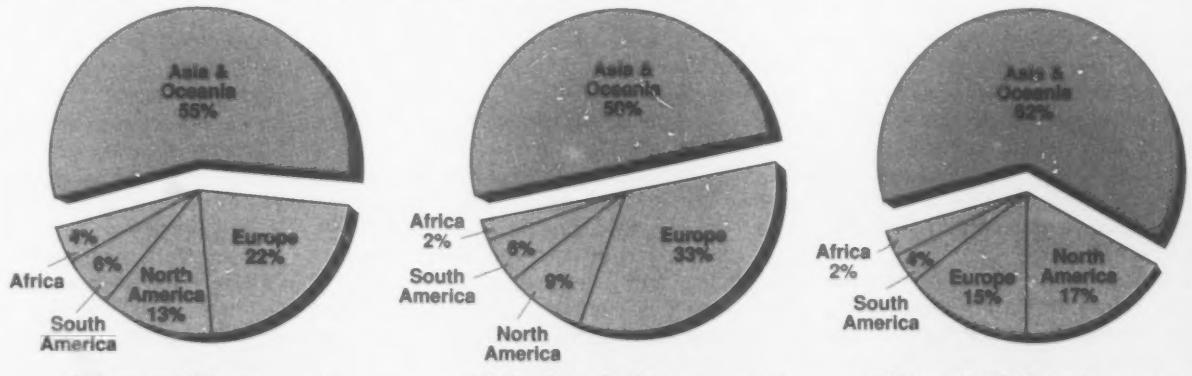
However, he is convinced that, in the apparel sector, "not all European production will migrate. There are always advantages in being close to the market—quality of service, quality of design, and so on, for which you can charge a premium." Also there are some tariff advantages for imports of textiles that use European fibers.

"Yes, there will be a market for fibers in Europe. Our customers are probably looking for materials with higher value added specific qualities. There is no reason to believe that the Western European industry is not capable of providing those fibers to the clothing industry in Europe. In volume terms, the market won't be as large, but there will still be a strong market for fibers for clothing."

Other sectors will be even healthier—household textiles and carpets, for example. And one sector—industrial fibers—is a solid growth area. These fibers are used in a variety of products, such as tires, geotextiles, and nonwovens, all linked to the state of the general economy. Imports of these fibers have been low: For many purposes, the producer must engineer them for specific uses. Industrial fibers cost more to produce, but give higher profit margins.

The imbalance of trade in fibers and fiber-consuming products, however, will continue to be a factor influencing the Western European industry. And, as Pur-

Far East dominates world consumption of staple fibers



1993 cotton fiber yarn use = 15.5 million metric tons

1993 cellulosic fiber yarn use = 1.46 million metric tons

1993 synthetic fiber yarn use = 4.74 million metric tons

Note: Yarns in above figures are short staple. **Sources:** CIRFS (International Rayon & Synthetic Fibers Committee), C&EN estimates

vis notes, although the Uruguay round of the GATT negotiations did provide some positive new opportunities, there were some disappointments, too. For example, some potentially large markets for fibers have remained essentially closed. India, for one, will maintain tariffs of more than 100% on fibers; European tariffs are being trimmed to about 4%. Tariffs will remain high as well in Pakistan and Indonesia, and, although they will decrease in other Southeast Asian countries, the decline will extend over a decade and will still wind up at about 30 to 35%.

Entry to markets is one reason textile manufacturers, in particular, are heading east. Another reason is lower costs—especially labor costs.

Low labor costs must be buttressed by a reasonable infrastructure in a country. A company manager contemplating where to locate a plant, for example, would want docks from which to ship fibers; a governmental administrative and legal system sympathetic to businesses; and a reasonable level of education of the work force, as well as a work force that can be motivated.

CIRFS addressed the question of low labor costs in a report issued last May, "The Prospects for the Production of Spun Yarns During the 1990s," which is providing the basis for a new report due out soon. This study was an attempt to look at the prospects for fiber makers by examining a major market sector for fibers: spun yarns, which account for slightly more than half of total world production of both natural and man-made fibers. Spun yarns are used in apparel—cottons, cotton-polyester blends, wools, and the like—as well as in carpet and household textiles. They also have a wide variety of industrial textile applications.

The CIRFS report points out that many factors besides direct labor and production costs can make the difference between a thriving or dying textile industry in any given country. Italy's spinning industry, for example, continues to be buoyant, although that country has the highest indirect charges as a percentage of gross wages and one of the highest total labor costs in Western Europe.

In contrast, in the U.K., where labor costs compare favorably with most other developed countries except for Spain, Portugal, Greece, and Hungary, the textile industry has virtually disappeared over the past decade. The reasons: a highly concentrated retail structure and a laissez-faire political stance on trade policy issues, resulting in rising imports of yarns and fabrics at very low prices that have swamped the domestic textile industry.

The report concludes that labor costs are not the only significant factor in any comparison of production costs among various Western European countries, but they are probably the prime consideration in the garment sector, in particular, outside Western Europe. In Europe, for example, labor accounts for some 46% of total costs, compared with 7% in Indonesia.

However, the picture is always changing. The study points out that figures confirm the relocation of industry away from the newly industrialized countries where wage costs are rising—for instance, from South Korea and Taiwan—toward even lower wage-cost countries such as Indonesia, Sri Lanka, India, and China. And it is in those countries that producers of man-made fibers see their export chances as slim.

That is particularly frustrating to Western European fiber makers, because man-made fibers are increasing their share of market in developing countries.

In the spun-yarn category, the CIRFS study notes, cotton is still the major single fiber worldwide, given its predominance in countries like India and Pakistan. However, though man-made fibers now account for more than one third of the total spun-yarn market in Western Europe, in developing countries, including those with centrally planned economies, the share of man-made fibers has reached nearly 40%. In China, the world's largest cotton producer, man-made fibers' share of total fiber consumption has grown from 10% in 1975 to more than one third at the start of this decade.

In 1970, in Western Europe, synthetic fibers accounted for only 20% of all fiber in spun-yarn production, the same percentage as wool; cotton had a market share of nearly 50% and cellulosic fibers had a market share of 13%. By the mid-1980s, both cellulosics and wool had lost significant ground to synthetics, while cotton's position had stagnated: Synthetic fibers accounted for about one third of all fibers in spun-yarn production.

More worrisome for man-made fiber producers in Western Europe, however, is the fact that since the mid-1980s, synthetic fiber consumption for spun-yarn production has fallen back to the levels of the late 1970s, and further declines are expected during the next 10 years. The main reasons are external factors such as the changing tariff structures and increased imports of apparel, primarily made from cotton. By the year 2003, free access will be permitted into the developed market economy countries, the CIRFS report points out.

One of the major exporting countries is China, where fiber consumption for spun yarns grew by two thirds in the 1980s. Demand for raw cotton rose about 1 million metric tons, broadly in line with the growth in cotton production. However, use of synthetic fibers has skyrocketed. In the 1980s, production of nylon rose 310% to 130,000 metric tons per year; polyester staple went up 421% to 602,000 metric tons per year; and acrylic fiber rose 111% to 122,600 metric tons per year.

What's more, man-made fibers get high emphasis in the current five-year plan, although cotton by volume will remain the largest fiber. By 1995, CIRFS predicts, man-made fiber consumption will reach 2.6 million metric tons per year, of which 2.1 million metric tons—500,000 above the 1990 level—will be produced domestically. And by the year 2000, consumption is expected to be 3.5 million metric tons, of which 85% will be manufactured domestically.

Joint ventures with companies in Hong Kong, Japan, the U.S., the Philippines, and Singapore, and the incorporation of Hong Kong into China in 1997 will act as a spur in the quality of fabrics and apparel produced, to ensure that China continues to earn hard currency.

A case in point is the agreement between DuPont and China Worldbest Development Corp. (majority owned by the China National Textile Council) to explore the possibility of a joint venture to make and market Lycra elastane fibers in China, announced two weeks ago. According to DuPont, Lycra can be combined with many fibers being used in China such as cotton, nylon, wool, and silk to enhance the fit and shape retention of garments. DuPont already has Lycra plants in Japan and Singapore and recently doubled its capacity for the fiber in Singapore.

And BASF disclosed at the beginning of this month that it plans to build another plant at its site in Pudong, Shanghai's industrial zone, as part of its joint venture, Shanghai BASF Colorants & Auxiliaries Co. This plant, which will make 25,000 metric tons per year of textile and leather auxiliaries, follows the announcement last November of a 3,000-metric-ton-per-year plant for cationic textile dyes, and of an earlier plant to

make 6,000 metric tons per year of pigments. All the plants are part of an investment totaling about $170 million.

As CIRPS concludes in its study: "In order to maintain their involvement in the sector, it may be increasingly necessary for Western European man-made fiber makers to relocate their manufacturing capacities nearer sources of low labor costs, not given the level of labor costs involved per se, but rather to be nearer major sources of apparel manufacture, which could subsequently be exported to Western Europe." Such an argument would obviously also apply to man-made fiber producers in the U.S., Japan, Taiwan, and South Korea.

For the Western European fiber maker, the future is one of changes. Fiber makers, and their chemical raw-material suppliers, will have to be nimble in meeting new demands—from whatever geographical direction. As CIRPS' Purvis puts it, "The needs of the industry tomorrow are not what they are today—let alone yesterday." □

French chemical industry to pick up this year

Output of the French chemical industry was up 1.3% last year over 1992, despite the generally depressed economy. Production in 1994, however, is expected to increase by about 2% over last year, compared with an average increase of about 1.5% in chemical output predicted for Western Europe. The pharmaceuticals sector will bolster the French industry, whose total output otherwise would be up only about 1%.

Those were among the statistics presented earlier this month by the Union des Industries Chimiques (UIC), the French chemical industry association, in what was an encouragingly optimistic briefing session.

Chemical sales, however, did not show the same pattern as production, slipping 1% last year from 1992. Had pharmaceuticals been excluded from total sales, the decline would have been 2%. The difficulties of the chemical industry in 1993 resulted much more from the drop in selling prices—although the decline varied markedly in the various product sectors—than from any drop in production.

The gloomy economic situation took its toll on the chemical industry throughout Europe. European chemical production as a whole had been up 2.6% in 1992 over the previous year, but fell 1.4% last year. The consolidated decrease was caused by drops in production of 3% in both Germany and Italy, and of 1% in Spain; it was only partly offset by the 1.3% increase in production in France and by 3% in the U.K.

The general European recession slowed the growth in production of the French chemical industry from a rate of 5.5% in 1992. It also put a damper on capital spending, which declined slightly, and it accelerated job losses. From October 1992 to October 1993, the chemical industry shed 1.3% of its employees, down to roughly 260,000 employed; in the comparable period in 1992, the decline had been only 0.3%.

One problem that continued to confront the French chemical industry last year was that, although output still grew, overall French industrial production dropped 4% from 1992. This affected end-use markets, causing a number of sectors to register declines in production: electronics, down 2%; metal industry, 5%; textiles, 7%; machine industry, 8%; and automobiles, 14%.

However, growth in chemical industry production is expected to continue to outpace that of general industrial production, predicted Francis Bazile, president of the UIC, as substitution of chemical products for nonchemical components continues—engineering plastics for metal, for example, in autos. Moreover, he pointed out that a considerable portion—40%—of chemical production is destined for consumption in households, and that these markets don't fluctuate as much as industrial ones.

The French chemical industry was also able to find some cheer in its trade performance. The surplus trade balance for French chemicals last year is estimated to amount to $6.49 billion, up from $4.50 billion of 1992.

UIC's economists noted that the trade figures are provisional. Because of a change in the way that countries within the European Union (formerly called the European Community) now collect statistics on intra-EU trade, trade figures "are difficult" to obtain properly. As the methodology is improved, however, statisticians predict that confusion will end. They forecast that final figures for the French chemical industry's trade balance will be lower than current estimates, but still about $5.40 billion. As one UIC staffer put it, "That is still very good."

Last year's capital spending by the chemical industry was more than $3.42 billion, some 5% of total sales. That was down about $290 million from the amount invested in 1992—not surprising, given the existence of overcapacity in various sectors of the industry and the mediocre outlook for demand in 1994. Capital spending in 1992 marked the second decline in a row from the record $4.18 billion the industry spent in 1990.

Roughly 40% of capital spending in 1993—$1.3 billion to $1.4 billion—was devoted to environmental and safety measures, up slightly from that of 1992. And keeping at least level with 1992, spending on research and development was $4.14 billion, or 6% of sales.

After managing to withstand the unfavorable business conditions during 1993, the French chemical industry will have a limited recovery this year, UIC economists predicted. However, they added that the recovery depends on certain essential factors, including the reduction of short-term interest rates, "which penalized the economy in 1993", a stronger dollar, making things more favorable for European exporters; and a continuing low price of oil and, consequently, of many of the industry's raw materials.

Patricia Layman

Pharmaceuticals pace chemical output in 1993

Sector	% change from 1992
Inorganic chemicals	–7.0%
Basic inorganic chemicals	
Fertilizers	
Organic chemicals	1.5
Basic organic chemicals	
Pharmaceutical intermediates	
Plastics	
Synthetic rubber	
Essential oils	
Specialty chemicals	1.0
Soaps, detergents	
Coatings, inks	
Agrochemicals	
Photographic products	
Perfume, cosmetics	
Miscellaneous specialties	
Pharmaceuticals	4.7
TOTAL	1.3%

Source: Union des Industries Chimiques